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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/400,755	09/22/1999	STEVEN J. HARRINGTON	XER-2-0277	3771

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EXAMINER

DASTOURI, MEHRDAD

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 04/07/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/400,755

Applicant(s)

HARRINGTON, STEVEN J.

Examiner

Mehrdad Dastouri

Art Unit

2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 March 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on February 3, 2003, has been entered and made of record.
2. 35 U.S.C. 112 second paragraph rejection of Claims 5 and 16 have been withdrawn in view of Applicant's amendment.
3. Applicant's arguments have been fully considered but they are moot in view of new grounds of rejection.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, 5, 13, 14 and 16 are under 35 U.S.C. 103(a) as being unpatentable over Robinson et al (A Framework for Interacting with Paper, Eurographic Association) in view of Billingham et al (Wearable Computers for Three Dimensional CSCW).

Regarding Claim 1, Robinson et al disclose a method of verifying a projected image within a view plane of an augmented-reality display system as a preselected movable object spaced from a user's viewpoint by a first distance (the piece of paper is movable on the digital desk) whereby the object may be employed as an interface tool for the system, comprising steps of:

identifying a representative characteristics of the object within the view plane (Page C-330, Section 2, System Architecture; Figures 1 and 2. The animated pages are annotated with marks in their corners to facilitate recognition and location on the desk top.);

determining dimensional aspects of the movable object from the projected image (Page C-332, Section 4.3, The Digital Desk. Dimensional aspects are identified by recognizing a page appeared on the desk, determining its position, reading its unique identifier and locating any interactors.);

computing a corresponding dimensional identity and location of the object at an object point relative to the view plane (Page C-332, Section 4.3, The Digital Desk. The dimensional identity and location of the object at an object point relative to the view plane are computed in accordance with the sequence of events identified in Section 4.3.); and

verifying whether the dimensional identity and location are reasonably consistent with predetermined standards for the object (Pages C-330 to C-332, Section 2, System Architecture, Registration of the object (piece of paper); Section 3, The Registry; Section 4.3, The Digital Desk, The sequence of events.).

Robinson et al do not explicitly disclose the projected image of the movable object and the movable object are spaced by different distances from the user's viewpoint.

Billinghurst disclose a computer supported collaborative work (CSCW) augmented reality system wherein the projected image of the movable object and the

movable object are spaced by different distances from the user's viewpoint (Figure 1; Pages 2 and 3, "Augmented Reality and CSCW" and "Technology Characteristics").

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Robinson et al invention according to the teachings of Billingham et al to consider the projected image of the movable object and the movable object being spaced by different distances from the user's viewpoint because it will improve the flexibility and versatility of the augmented reality system display. It will further expand the system capability to provide users' interaction with the real and virtual world simultaneously and browse the web pages floating around them in space (Billinghurst; Page 2, Column 1).

Regarding Claim 2, Robinson et al disclose the method as claimed in Claim 1 wherein the preselected object comprises a reference panel as a screen, tablet or piece of paper and identifying includes recognizing a corner of the panel (Figures 1 and 2, Page C-331, Section 4.2, Printing).

Regarding Claim 5, Robinson et al disclose the method as claimed in Claim 1 wherein the verifying includes testing from at least one of the tests of (a) whether the object has expected dimensions or proportions, (b) whether the corners are right angles, (c) whether a center point matches when calculated from distinct sets of the corners, (d) whether corners are generally in a common plane, and (e) whether the object lies within an expected viewing range (Pages C-330 to C-332; Sections 3, 4.3 and 4.4).

With regards to Claim 13, arguments analogous to those presented for Claim 1 are applicable to Claim 13. A piece of paper has been utilized as the real item as depicted in Figure 2.

With regards to Claim 14, arguments analogous to those presented for Claim 2 are applicable to Claim 14.

Regarding Claim 16, arguments analogous to those presented for Claim 5 are applicable to Claim 16.

6. Claims 3, 4, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robinson et al (A Framework for Interacting with Paper, Eurographic Association) further in view of Billingham et al (Wearable Computers for Three Dimensional CSCW) and Kusunoki et al (U.S. 6,266,057).

Regarding Claim 3, neither Robinson et al nor Billingham et al specifically disclose the method of Claim 2 wherein the determining comprises calculating distances between corners and a center point of the reference panel.

Kusunoki et al disclose an augmented reality information processing system wherein the dimensional aspects of the object is determined by calculating distances between corners and a center point of the reference panel (Figures 9A-9D and 19; Column 9, Lines 20-25; Column 11, Lines 23-35; Column 15, Lines 30-67, Column 20, Lines 1-20).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Robinson et al and Billingham et al combination according to the teachings of Kusunoki et al to determine the dimensional aspects of the

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object by calculating distances between corners and a center point of the reference panel because it is the simplest and most fundamental method for determining dimensional characteristics of two-dimensional quadrilateral geometric shapes such as sheet of papers.

Regarding Claim 4, Kuzunuki et al further disclose the method as claimed in Claim 3 wherein the computing comprises converting the calculated distances to the dimensional identity and location based on an assumption that the reference panel is structurally flat (Figures 9A-9D and 19; Column 11, Lines 23-35; Column 15, Lines 30-67, Column 20, Lines 1-20. Computing is based assuming the reference panel as structurally flat pages of a book.).

Regarding Claim 6, neither Robinson et al nor Billingham et al explicitly disclose the method as defined in Claim 1 wherein the preselected object comprised of three equidistant line points and determining the projected dimensions of the three equidistant line points.

Kuzunuki et al disclose an augmented reality information processing system comprising verifying a projected image as a preselected object comprised of three equidistant line points and determining the projected dimensions of the three equidistant line points (Figures 9A-9D and 19; Column 9, Lines 20-25; Column 11, Lines 23-35; Column 15, Lines 30-67, Column 20, Lines 1-20).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Robinson et al and Billingham et al combination according to the teachings of Kuzunuki et al to verify a projected image as a preselected

object comprised of three equidistant line points and determining the projected dimensions of the three equidistant line points because it is the simplest and an essential method for determining dimensional characteristics of known geometric shapes such as sheet of papers.

Regarding Claim 7, Kuzunuki et al further disclose the method as defined in Claim 6 wherein the computing comprises calculating object coordinates in real space of the object point based on the projected dimensions of the three equidistant line points in the view plane and known augmented-reality display system geometric dimensions (Figures 9A-9D and 19; Column 9, Lines 20-25; Column 11, Lines 23-35; Column 15, Lines 30-67, Column 20, Lines 1-20).

7. Claims 8, 11, 12, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robinson et al (A Framework for Interacting with Paper, Eurographic Association) further in view of Billingham et al (Wearable Computers for Three Dimensional CSCW) and Wilson et al (U.S. 6,278,479).

Regarding Claim 8, arguments analogous to those presented for Claim 1 are applicable to Claim 8.

Neither Robinson et al nor Billingham et al explicitly disclose unprojecting the dimensional representation to calculate a plurality of object coordinates representative of a size of the object and a distance of the object from the viewing plane.

Wilson et al disclose a dual reality system comprising calculating a plurality of object coordinates representative of a size of the object and a distance of the object

from the viewing plane by unprojecting the dimensional representation of the object in the viewing plane (Figures 3 and 10-15; Column 7, Lines 45-67, Column 8, Lines 1-43).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Robinson et al and Billinghamurst et al combination according to the teachings of Wilson et al to calculate a plurality of object coordinates representative of a size of the object and a distance of the object from the viewing plane by unprojecting the dimensional representation of the object in the viewing plane because it will provide enhanced visualization of an augmented reality system comprising of a computer generated image superimposed with a real image.

Regarding Claim 12, arguments analogous to those presented for Claim 5 are applicable to Claim 12.

Regarding Claim 15, neither Robinson et al nor Billinghamurst et al explicitly disclose the system as defined in Claim 14, wherein the controller includes means for computing three dimensional object coordinates of the piece of paper relative to the view plane.

Wilson et al further disclose a dual-reality system comprising means for computing three dimensional object coordinates relative to the view plane (Figures 3 and 10-15; Column 7, Lines 45-67, Column 8, Lines 1-43).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Robinson et al invention according to the teachings of Wilson et al and Billinghamurst et al combination to computing three dimensional object coordinates relative to the view plane because it is the simplest and most fundamental

method for determining three dimensional coordinates of a two-dimensional geometric shapes such as sheet of papers relative to a viewing point outside the object plane.

Regarding Claim 17, Wilson et al further disclose the method defined in Claim 8 wherein the unprojecting comprises unprojecting a plurality of dimensional representation of the object attribute to movement of the object in the variable viewing area (Figures 3 and 10-15; Column 7, Lines 45-67, Column 8, Lines 1-43).

8. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robinson et al (A Framework for Interacting with Paper, Eurographic Association) further in view of Billingham et al (Wearable Computers for Three Dimensional CSCW), Wilson et al (U.S. 6,278,479) and Kuzunuki et al (U.S. 6,266,057).

Regarding Claims 9 and 10, arguments analogous to those presented for Claim 6 are applicable to Claims 9 and 10.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehrdad Dastouri whose telephone number is (703) 305-2438.

The examiner can normally be reached on Monday to Friday from 8:00 a.m. to 4:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604.

The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular and for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center Customer Service Office whose telephone number is (703) 306-0377.


Mehrdad Dastouri
Patent Examiner
Group Art Unit 2623
April 6, 2003